CAN *Newsletter Online*

BAUMA 2022

The heartbeat of construction industry

From October 24 to 30, around 3200 companies from over 60 countries presented their novelties for construction, building materials, and mining machinery industries in Munich (Germany).

(Source: Messe München)

About 80 CiA member companies were part of the Bauma. CAN in Automation (CiA), Microcontrol, esd electronics, ehb electronics, Kvaser, and Baumer were co-exhibiting their products and services on the joint CiA stand. About 60 products with CAN, CANopen, or J1939 interfaces were presented on the CiA panel wall. According to Messe München, more than 495 000 visitors from over 200 countries came to the fair. Germany, Italy, Turkey, Great Britain and Northern Ireland, as well as Netherlands were the top five exhibitor countries. Franz-Josef Paus, Managing Director of Paus Maschinenfabrik and Chairman of the Bauma Advisory Board summarized that digitalization and automation were topics that dominated the trade fair. As an important part for automation of heavy-duty constructing applications, CAN is also going to be part of the next Bauma scheduled for April 7 to 13, 2025 in Munich.

The CAN Newsletter already reported about some [Bauma highlights](#) in advance.

Facts and figures

The fair stretched across 200 000 m^2 of hall space and 414 000 m^2 of outdoor space. Of course, it was not possible to see everything. But, the most of the exhibiting CiA members and further companies providing CAN-connectable electronic equipment were located in four neighboring halls A2 to A5.

Bauma 2022: A magnet for over 495 000 visitors (Source: Messe München)

Interfacing humans and machines

To interact with versatile mobile machine applications, a variety of devices is required. Diverse joysticks, keypads, push-buttons, switches, and pedals were offered by several manufacturers.

Hall-effect foot pedal switch (Source: Otto Controls)

The CANopen and J1939 control solutions by Otto Controls (USA) include joysticks, grips, switches, pedals, and push-buttons for off-road, material-handling, and further applications. Sollido distributes the products from HE-Tronic (both Germany), which manufactures proportional joysticks, control panels, and other HMIs (human-machine interfaces) with CAN for mobile machines. A further German provider Rafi presented its armrests and joysticks at the fair. The company also produces CAN-connectible ECUs (electronic control units) for use in touch-screens and panels. The Italian company Ravioli, which manufactures CAN-customizable slip rings, rotary limit switches, push buttons, and joysticks, was also part of the fair.

Graf-Syteco demonstrated the recent GS-Multiline smart HMI (human-machine interface) incorporating a two-part display with programmable touch-buttons. The ruggedized all-in-one device allows to choose the displayed content as well as the symbols and meaning of the buttons. This enables a flexible adaptation of the HMI to a given application. The company also offers touch-panel PCs, keypads, I/O modules, and telematic modules supported by dedicated software.

Flexibly-programmable GS-Multiline HMI (Source: Graf-Syteco)

Apem (Germany) has shown its joysticks, panel switches, and industrial controls with J1939 connectivity. Littelfuse (USA) provided CAN-capable switches, buttons, and connectors for commercial vehicles. The MJ-30K joystick presented by Metallux (Germany) uses CANopen and J1939. It was concepted for multi-axial control of commercial vehicles, cranes, ships, etc. Brehmer (Germany) offers joysticks, push- and rotary-buttons, foot-switches, and pedals with CAN connectivity. Another distributor of joysticks, pedals, and sensors with CANopen and J1939 interfaces, is Indemar (Italy). The electronic interfaces of these devices are developed by Genge & Thoma (Switzerland), a CiA member company.

Joystick of the XP series
(Source: APEM)

...hibited its portfolio of smart solutions for mobile and field markets offering CAN... The devices include electronic pedals, control levers, joysticks, buttons, keypads, sensors, and displays. Additionally, different control units for I/Os, power, relays, motors, and valves were presented by the company. Standard products from Grayhill (USA) include rotary switches, keypads, joysticks, optical encoders, displays, and push-buttons. Some of them provide CAN interfaces, which can tolerate CAN FD frames. The Belgian manufacturer MCS (Mobile Control Systems) has shown a variety of its heavy-duty throttle pedals and hand throttles, which can be provided with a CAN module supporting CANopen and J1939.

MO 406 CAN-capable keypad with a rotary button (Source: Makersan)

Controller, displays, and panel PCs

Numerous control solutions were offered on the fair. For example, E-T-A Elektrotechnische Apparate has shown its CAN-connectible SCS Smart Control Solutions family including mini control units, I/O extension modules, and power distribution systems. The devices support CANopen, J1939, and Isobus higher-layer protocols. Another German company, Bressner, has embedded box PCs, industrial PCs, panel PCs, touch displays, IIoT (Industrial Internet of Things) hardware, etc. in its portfolio. The devices can be equipped with a CAN interface using PCIe expansion cards.

Tuff panel PC with J1939 connectivity (Source: Motium)

Australian manufacturer Motium exhibited the Tuff and Tuff+ panel PCs with J1939 (other on request) connectivity as well as appropriate CAN cables. The rugged devices with different display sizes are dedicated for use in transportation, construction, mining, industrial automation, military, marine, and further applications.

FJDynamics (Singapore), a provider of satellite-based digital construction and precision agriculture solutions, has shown its FJD G31 excavator guidance system including a CAN-capable control terminal with a touch-display, sensor modules, and antennas for GNSS (global navigation satellite system) and 4G. Hexagon, a parent company of Leica Geosystems (Germany), presented Leica iCON field controllers for construction machinery. The touch-panel PCs and provider's GNSS machine receivers are connectable to CAN-based in-vehicle networks.

DSE (Deep Sea Electronics, UK) presented a range of control systems for engines, pumps and compressors as well as programmable controllers and displays for vehicles and off-highway machinery. CANopen and J1939 connectivity is provided. DSE's sister-company Motortech (Germany) is a system supplier for gas engines. It produces ignition controllers, stepper motor drivers, and temperature acquisition modules with CANopen interfaces.

System Technik Wiedemann (STW, Germany) has shown a number of mobile controllers, display controllers, and on-board controllers with CANopen and J1939 connectivity. The company offers devices, software, and (also cloud-based) system solutions for machine-to-X communications. For example, the TCG-4lite on-board telematics module can be used for fleet management of the vehicles in the field.

MIC3+ ignition controller (Source: Motortech)

Vscale E3 operator terminal with two CAN interfaces (Source: Wika)

Wika (Germany) showcased the Vscale E2 and Vscale E3 operator terminals for mobile machinery. The devices can be connected to CANopen and J1939 networks. The GEN2 Acti-Ways SPU 30-17 and SPU 70-66 ECUs (electronic control units) for controlling hydraulic functions in harsh environments are available from Actia (Germany). The units provide CAN FD connectivity.

Epec (Finland) exhibited its broad CANopen- and J1939-capable portfolio of rugged control units, displays (also wireless), IoT (Internet of Things) gateways, and safety-related control units on the trade show. Recently, the firm released the SDK 4.7 (software development kit) and Epec Multitool 7.5. The improvements enable an easier way to adjust the non-volatile memory areas, support for XDD and XDC file formats, and centralized location of the CAN cards' DLL files. In addition, the SDK includes Epec Codesys 3.5 Isobus programming manuals.

Remote control

Several companies presented their remote-control solutions consisting of a remote controlling device with a wireless transmitter and a receiver device to be integrated in a controlled application. The Remotus T-Rx product line by Akerströms (Sweden) includes waist and hand-held transmitters as well as CANopen-connectable receivers T-Rx 100. The latter supports the CiA 401 device profile for I/O modules and layer setting services (LSS) according to CiA 305. A further provider of remote controllers is the Swedish Scanreco. For example, the G6 CAN Receiver provides CANopen connectivity and is suitable for applications up to SIL 3 (safety integrity level). The remote-control units from Tele Radio (Sweden) e.g. Tiger and Panther series, implement CANopen and J1939 higher-layer protocols in their receivers. These are also available for safety implementations up to SIL 3.

CANopen-connectable receiver Remotus T-Rx (Source: Akerströms)

Tools and software

PPU Omega (Poland) offered the visitors its Xtrack set of tools for online management of assets, resources in the field, fleets, and machines. Communication with managed vehicles is done via an on-board terminal equipped with Xtrack software. Handled functions are identification and inventory of assets, planning, and delegating of tasks, monitoring, reporting, and analysis of execution progress. Amongst others, the tool set ecosystem includes on-board data loggers, automatic RFID (radio frequency) identification system, and Digisens Eleiro dynamic weighing system. These systems support the CleANopen (CiA 422) application profile for

municipal vehicles.

Device Insight (Germany) is a software provider for IoT solutions and Edge gateways from different manufacturers. Depending on customer requirements, solutions for CAN-based networks (e.g. CANopen, J1939, or proprietary) can be realized.

Sensors

NEO series of draw-wire encoders (Source: Siko)

For rotary positions measurements, Siko (Germany) showcased its WV3600M and WH3600M magnetic encoders. The CANopen variant implements the CiA 406 device profile for encoders. As a preview, the manufacturer has shown the NEO series of draw-wire encoders with CANopen, J1939, and CANopen Safety interfaces suitable for up to PL d (performance level) applications.

The CiA member Rota Engineering (UK) manufactures transducers for tough applications. For example, the CAN-connectable TLT series monitors the fuel-level and temperature in diesel, oil, etc. tanks. The LJW series can measure up to 720 bars of pressure in sub-sea applications. The LL sensors are dedicated for linear position measurements. These devices provide CAN connectivity. Bedia Motorentechnik (Germany) demonstrated its OLTC sensor for level and temperature monitoring of engine and hydraulic oils as well as diesel fuels. Measurements up to 600-mm can be output via CANopen or J1939 interfaces. Wika also presented its sensors for mobile control solutions. The sensors offer CANopen and J1939 connectivity.

Telemechanique Sensors, a daughter company of Schneider Electric, is working on the ultrasonic sensor with a CAN interface. The device is suitable for position detection and collision avoidance of moving parts in mobile equipment. The latter include e.g. truck loading cranes, garbage trucks, scissor and boom lift platforms, fork lifts, etc.

Miscellaneous

Luis Technology (Germany) presented its CAN-capable Luis Turn Detect 4.0 ECU (electronic control unit) with three digital video inputs, as well as one digital and one analog video output. The company is currently working on the Luis Edge AI 4.0 digital (night-vision) camera, which outputs an alarm signal via CAN, in case an object is detected and the driver has to be aware. Also, from Germany comes Axion, which provides mobile multimedia systems. The CBR1219CAN Radio is controllable via a CAN connection.

Luis Turn Detect assistant (Source: Luis Technology)

To meet the growing flexibility demands of mobile machine design, Data Panel (Germany) presented the FLXtreme family of customizable distribution boxes for mobile equipment. The boxes supporting CANopen and J1939 higher-layer protocols are currently under preparation, but will be soon available on the market. Electric parts for vehicles e.g. high-current connectors and cables for CAN, were shown by the Germany-based Apparatebau Kirchheim-Teck.

R 9XX H2 hydrogen-powered excavator (Source: Messe München)

Delta-Q (Canada) exhibited its full range of power charging solutions with the ability to charge up to 22 kW. Some of the company's chargers support communication via CANopen.

And the winner is …

The R 9XX H2 hydrogen-powered excavator from Liebherr has won the Innovation Award at Bauma 2022. The CiA member company as well as other construction and commercial vehicle manufacturers use CAN-based networks for in-vehicle communication and for connection of additional equipment.

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